ARIZ 227c
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(5 Pages)

ROCK CORRECTION PROCEDURE FOR MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT DETERMINATION

(A Modification of AASHTO Designation T 224)

SCOPE

1. This procedure is used to determine the corrected maximum dry density and optimum moisture content for a sample of material when coarse aggregate or rock particles are retained on the No. 4 sieve (for Method A proctor) or 3/4 inch sieve (for Alternate Method D proctor).

(a) The rock correction procedure shall not be used when the material consists of volcanic cinders or light weight porous material on which the specific gravity cannot be determined with consistency or when the moisture absorption for the coarse aggregate is greater than 4.0%.

(b) The rock correction procedure shall not be used when the percent rock retained on the No. 4 for Method A is less than 10% or greater than 50% (greater than 60% in the case of an aggregate base material); or when the percent rock retained on the 3/4 inch sieve for Alternate Method D is less than 10% or greater than 50%.

NECESSARY INFORMATION

2. (a) Refer to, or determine the maximum dry density and optimum moisture content of the material by Method A (Arizona Test Method 225 or 232); or Alternate Method D (Arizona Test Method 245 or 246).

(b) For Method A, the percentage of rock particles in the sample which are coarser than the No. 4 sieve is recorded as "PR4". For Alternate Method D, the percentage of rock particles in the sample which are coarser than the 3/4 inch sieve is recorded as "PR3/4".

(c) If not known, determine the bulk oven-dry specific gravity of the coarse aggregate in accordance with AASHTO T 85.

NOTE: Once determined for a source, the specific gravity may usually be used for all rock corrections on material from that source. Any slight change in specific gravity

should not change the maximum dry density to a large extent. (A change of ± 0.02 could result in a change of ± 0.6 lb. per cubic foot.) Similarly, the maximum dry density of the passing No. 4 or passing 3/4 inch material, having been determined by Method A or Alternate Method D for a source, may usually be used for that source providing the sieve analysis of the passing No. 4 or passing 3/4 inch material and the Plasticity Index remain reasonably uniform.

ROCK CORRECTED MAXIMUM DRY DENSITY

3. The corrected maximum dry density of the total sample for the amount of rock (plus No. 4 for Method A proctor or plus 3/4 inch for Alternate Method D proctor) shall be determined by the following equation:

$$CMD = \frac{\left[(100 - PR) \times (MD)\right] + \left[(56.2) \times (PR) \times (SG)\right]}{100}$$

Where: CMD = Corrected maximum dry density of the total sample containing "PR" percent coarse rock particles, lbs./cu. ft.
PR = "PR4", percent rock retained on the No. 4 sieve for Method A; or "PR3/4" percent rock retained on the 3/4 inch sieve for Alternate Method D.
MD = Maximum dry density (Method A for plus No. 4; or Alternate Method D for plus 3/4 inch), lbs./cu. ft.
SG = Bulk O.D. Specific Gravity of the coarse aggregate.

Example (For Method A):

PR = PR4 = 29% rock retained on the No. 4 sieve.
MD = 114.0 lbs./cu. ft.
SG = 2.499

$$CMD = \frac{\left[(100 - 29) \times (114.0)\right] + \left[(56.2) \times (29) \times (2.499)\right]}{100}$$

$$CMD = \frac{[(71) \times (114.0)] + [4072.9]}{100} = \frac{[8094.0] + [4072.9]}{100}$$

CMD = 121.7 lbs./cu. ft. [Corrected maximum dry density of the total sample containing 29% rock retained on the No. 4 sieve.]

Example (For Alternate Method D):

PR = PR3/4 = 32% rock retained on the 3/4 inch sieve.
MD = 112.6 lbs./cu. ft.
SG = 2.526

$$CMD = \frac{[(100 - 32) \times (112.6)] + [(56.2) \times (32) \times (2.526)]}{100}$$

$$CMD = \frac{[(68) \times (112.6)] + [4542.8]}{100} = \frac{[7656.8] + [4542.8]}{100}$$

CMD = 122.0 lbs./cu. ft. [Corrected maximum dry density of the total sample containing 32% rock retained on the 3/4 inch sieve.]

ROCK CORRECTED OPTIMUM MOISTURE CONTENT

4. The rock corrected optimum moisture content of the total sample shall be determined by the following equation:

$$COM = \frac{[(OM) \times (100 - PR)] + PR}{100}$$

Where: COM = Corrected optimum moisture content for the total sample.

OM = optimum moisture content for Pass No. 4 (Method A) or pass 3/4 inch material (Alternate Method D).
PR = "PR4", % rock retained on the No. 4 sieve for Method A; or "PR3/4", % rock retained on the 3/4 inch sieve for Alternate Method D.

Example (For Method A):

OM = 14.3%
PR = PR4 = 29% rock retained on the No. 4 sieve.

$$COM = \frac{\left[(14.3) \times [100 - (29)]\right] + (29)}{100}$$

$$COM = \frac{\left[(14.3) \times (71)\right] + (29)}{100} = \frac{\left[1015.3\right] + (29)}{100}$$

COM = 10.4% [Corrected optimum moisture content of the total sample containing 29% rock retained on the No. 4 sieve.]

Example (For Alternate Method D):

OM = 15.2%
PR = PR3/4 = 32% rock retained on the 3/4 inch sieve.

$$COM = \frac{\left[(15.2) \times [100 - (32)]\right] + (32)}{100}$$

$$COM = \frac{\left[(15.2) \times (68)\right] + (32)}{100} = \frac{\left[1033.6\right] + (32)}{100}$$

COM = 10.7% [Corrected optimum moisture content of the total sample containing 32% rock retained on the 3/4 inch sieve.]

USE OF RESULTS

5. (a) The corrected maximum dry density obtained by this method is used, in comparison with the field density of the material, to determine the percentage of compaction.

(b) The corrected optimum moisture content is used to determine the amount of moisture which should be added to the material to achieve maximum dry density.

REPORT

6. (a) Report the corrected maximum dry density to the nearest 0.1 lb./cu. ft.

(b) Report the corrected optimum moisture content to the nearest 0.1 percent.